

## Claims

1. A sound reproducing apparatus for driving a plurality of speakers to reproduce multi-channel sound, the sound reproducing apparatus comprising:

5 generation means for generating a measuring signal and supplying the measuring signal to a to-be-detected speaker of the plurality of speakers;

at least two sensors disposed in a listening position, each of the at least two sensors transmitting a reception  
10 notification when receiving a measuring sound wave radiated from the to-be-detected speaker in accordance with the measuring signal;

time difference measuring means for measuring, as to each of the at least two sensors, a time difference between  
15 a time instant when the measuring signal is generated and a time instant when the reception notification is received from each of the at least two sensors;

distance calculating means for calculating, as to each of the at least two sensors, a distance between each of the  
20 at least two sensors and the to-be-detected speaker based on the measured time difference;

position calculating means for calculating a position of the to-be-detected speaker based on a distance between the at least two sensors and the calculated distance; and

25 storage means for storing the calculated position of the to-be-detected speaker.

2. The sound reproducing apparatus according to Claim 1, comprising speaker layout correction means for changing over  
30 signal lines from an amplifier to the speakers and correcting

an incorrect layout of the speakers when it is judged that respective speaker positions stored in the storage means are out of a predetermined relative position relationship of the speakers.

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3. The sound reproducing apparatus according to Claim 1, comprising a sound field control means for producing sound image localization as if the speakers were located in predetermined recommended positions, respectively, based on  
10 respective positions of the speakers stored in the storage means.

4. The sound reproducing apparatus according to Claim 1, wherein

15 a distance between at least two speakers of the plurality of speakers is known; and

the position calculating means calculates a distance between the at least two sensors and positions of the at least two sensors based on distances between the at least two sensors and the at least two speakers calculated by the distance  
20 calculating means, and the distance between the at least two speakers.

5. A sound reproducing apparatus for driving a plurality  
25 of speakers to reproduce multi-channel sound, the sound reproducing apparatus comprising:

generation means for generating a measuring signal and supplying the measuring signal to at least two measuring speakers of the plurality of speakers in turn, the measuring  
30 speakers having known positions with respect to a listening

position;

a sensor that is attached to a to-be-detected speaker and transmits a reception notification as to each of the at least two measuring speakers when receiving a measuring sound wave radiated from each of the measuring speakers in accordance with the measuring signal;

time difference measuring means for measuring, as to each of the at least two measuring speakers, a time difference between a time instant when the measuring signal is generated and a time instant when the reception notification is received from the sensor;

distance calculating means for calculating, as to each of the at least two speakers, a distance between each of the measuring speakers and the to-be-detected speaker based on the measured time difference;

position calculating means for calculating a position of the to-be-detected speaker based on a distance between the at least two measuring speakers and the calculated distance; and

storage means for storing positions of the at least two measuring speakers and the calculated speaker position.

6. The sound reproducing apparatus according to Claim 5, comprising a speaker layout correction means for changing over signal lines from an amplifier to the speakers and correcting an incorrect layout of the speakers when it is judged that respective speaker positions stored in the storage means are out of a predetermined relative position relationship of the speakers.

7. The sound reproducing apparatus according to Claim 5,  
comprising a sound field control means for producing sound  
image localization as if the speakers were located in  
predetermined recommended positions, respectively, based on  
5 respective speaker positions stored in the storage means.

8. A method of identifying positions of a plurality of  
speakers by use of at least two sensors disposed in a listening  
position, the method comprising the steps of:

10 generating a measuring signal and supplying the  
measuring signal to one of the plurality of speakers;  
transmitting a reception notification when each of the  
at least two sensors receives a measuring sound wave radiated  
from the to-be-detected speaker in accordance with the  
15 measuring signal;

measuring, as to each of the at least two sensors, a  
time difference between a time instant when the measuring  
signal is generated and a time instant when the reception  
notification is received from each of the at least two sensors;

20 calculating, as to each of the at least two sensors,  
a distance between each of the at least two sensors and the  
to-be-detected speaker based on the measured time difference;

calculating a position of the to-be-detected speaker  
based on a distance between the at least two sensors and the  
25 calculated distance; and

providing a storage means for storing the calculated  
speaker position.

9. The method according to Claim 8 further comprising the  
30 step of changing over signal lines from an amplifier to the

speakers and correcting an incorrect layout of the speakers when it is judged that stored positions of the speakers are out of a predetermined relative position relationship among the speakers.

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10. The method according to Claim 8, further comprising the step of producing sound image localization as if the speakers were located in predetermined recommended positions respectively, based on stored positions of the speakers.

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11. The method according to Claim 8, further comprising the steps of:

supplying the measuring signal in turn from the generation means to at least two measuring speakers of the plurality of speakers, the at least two measuring speakers has a known distance from each other; and

transmitting, as to each of the two measuring speakers, a reception notification when each of the at least two sensors receives a measuring sound wave radiated from each of the measuring speakers in accordance with the measuring signal;

measuring, as to each of the at least two measuring speakers, a time difference between a time instant when the measuring signal is generated and a time instant when the reception notification is received from each of the at least two sensors;

calculating, as to each of the at least two measuring speakers, a distance between each of the at least two sensors and each of the measuring speakers based on the measured time difference; and

calculating positions of the at least two sensors and

a distance between the at least two sensors based on a distance between each of the at least two sensors and each of the measuring speakers and a distance between the at least two speakers.